Mobile Slaughter Unit for Wyoming

Assessment of Need and Values

Project Report: July 1, 2004

Federal States Marketing Improvement Program Grant

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ABSTRACT

The overall objective of this project is to support a collaborative effort between the Wyoming Business Council, Wyoming Rural Development Council, Wyoming Department of Agriculture, Sheridan Community College, and agriculture producers in the State of Wyoming to determine need and application for a mobile slaughter unit. The proposal is to support three projects and objectives: 1) develop and administer a survey of agriculture producers (beef, hog and lamb) in the State of Wyoming to determine need and practicability of a mobile slaughter unit; (2) determine the status of meat processing plants currently in the State of Wyoming, their status of operation and USDA certifications; and (3) prepare a cost analysis to determine the economic impacts of such a unit, including options of financing, economic comparison of how meat is processed today versus utilizing a mobile machine; and exploring economics of capitalizing on by-products.

The result of completing this feasibility study and economic analysis will be to provide State officials and agriculture producers with the best information on alternative methods of meat processing which will address food safety, maintaining meat quality, more direct marketing of products, and opportunities to enhance profit margins. With this information and the economic analysis, a decision will be made whether to move ahead with the purchase of a mobile slaughter unit.

EXECUTIVE SUMMARY

This project sought to gauge the level of interest in mobile, USDA inspected slaughter and processing among Wyoming livestock producers, as well as quantifying the cost and added value of such an operation.

The survey yielded 288 responses from livestock producers throughout Wyoming. A significant number of these (66.3%) indicated they would consider using a USDA inspected unit if one were one available. Of the respondents expressing interest, 31.5%% indicated they are already marketing direct to the consumer. Responding Wyoming livestock purchasers also reported a variety of niche marketing strategies being utilized such as grass fed (36.2%) and all-natural at 29.4%. Marketing some product as organic was listed by 10% of the respondents who were interested in the mobile slaughter concept.

Currently in Wyoming, there are no USDA inspected plants. Producers using the state inspected plants are able to sell to restaurants, institutions, retail stores and consumers only within the State of Wyoming. Individuals can utilize custom plants to slaughter and process animals, but the product must be returned to the individual and cannot be resold.

The economic analysis resulted in a detailed review of projected costs for different scenarios. Calculations were made for a single mobile slaughter unit (MSU) and a higher capacity double MSU (the double unit includes the slaughter unit and a separate refrigerated unit for carcass transport). Assuming a full capacity operation, both of these units are projected to have processing costs economically competitive with

existing state inspected plants. The single MSU is projected to have a $291 cost/animal (beef) and the double MSU $241. Processing costs for existing state plants surveyed ranged from $220/animal to $305/animal. A double MSU is projected to create 10 full-time jobs and an increase of value-added wealth of $1.7 million annually.

The results of this study would indicate that there is a significant number of Wyoming livestock producers interested in utilizing a MSU and that the costs would be competitive with the existing state inspected plants.

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CHAPTER I

BACKGROUND AND RATIONALE

This project was undertaken to determine the need and value of a mobile, USDA inspected, livestock slaughter unit for Wyoming. Collaborators on this project included the Wyoming Business Council, Wyoming Rural Development Council, Wyoming Department of Agriculture, and Sheridan College. These entities, with input from Wyoming's livestock industry, felt there were compelling reasons to pursue the idea of a mobile slaughter unit. The reasons included the following: absence of any USDA inspected slaughter and processing facilities in Wyoming; the national and international level of concern regarding food safety, including traceability; issues of livestock handling and meat quality, including humane slaughter; the growing interest in alternative marketing strategies that include forage fed, natural and organic meat products.

Processing Facility Limitations: Availability and Access

The meat processing industry has become more consolidated in recent years resulting in fewer locations where animals may be processed under USDA inspection. This has created a crisis for limited-resource producers that cannot afford to transport small numbers of animals long distances for slaughter and processing. In addition, producers marketing their own products typically must make the return trip to the packing house to retrieve packaged meat, which results in additional costs. The current system also makes it difficult to sell inspected meats in the communities where they are produced.

In Wyoming there are currently no USDA inspected facilities. This situation requires producers who are interested in interstate marketing of their livestock to leave the state in search of federal slaughter and processing facilities. This not only increases costs, but also results in greater stress on the animals. Consequently, transportation stress may manifest itself as "dark cutters" in beef or "pale, soft, and exudative" in pork, which ultimately means a major price reduction. It should also be noted that the basic food safety regulation allowing for interstate sales in the U.S. is slaughter and processing under USDA inspection, a service currently unavailable in Wyoming. Lack of availability and access to USDA inspected facilities tend to discourage producers from pursuing new marketing strategies or expanding their existing markets.

Food Safety and Environmental Concerns

While the safety of foods has long been of paramount importance to the consumer, recent incidents of bovine spongiform encephalopathy (BSE) have highlighted public awareness of the issue both in the U.S. and abroad. Bob Speller, Minister of Agriculture and Agri-Food, Canada, has said, "Over the past decade, the world meat industry has shifted from being production-oriented to being consumer-oriented. Today consumers around the world are demanding safe, high quality food, produced in an environmentally responsible manner." A report from the USDA's Economic Research Service shows that the 14 largest slaughter and packing plants handle 63% of US beef, which is over one million head per year. An episode of contamination in plants with such high volume is guaranteed to be substantial and widely distributed (MacDonald et. al, 2000).

Issues inherent to large slaughter facilities are typically avoided by the use of a mobile slaughter unit (MSU). By its very nature, the MSU restricts problems to small lots in a limited geographic area; product is also more readily traceable as to its origin. Traceability or identity preservation is already a major concern in international markets. Countries that have instituted trace back systems in one form or another include the European Union (EU), Denmark, Germany, Sweden, Australia and Japan (Bailey and Hayes, 2002). According to Bailey and Hayes (2002), "The development of traceability systems in the U.S. seems inevitable. U.S. red meat producers and processors should be examining methods to provide more traceability in the U.S. system, not only from the perspective of reducing liability (e.g., tracing the source of food contamination) but also from the perspective of expanding both domestic and export markets." Traceability is an integral part of the mobile slaughter unit operational system.

Another integral part of the MSU is its minimal impact on the environment. Again, because of the nature of the unit, large feedlots and processing plants are not factors in the equation. The MSU is designed to process small numbers of livestock throughout a large area, which results in low daily outputs of animal waste, wastewater, and other emissions. Studies show that more consumers are willing to pay for food grown in an environmentally sound manner, and they are also willing to pay for food grown in their own community (Diel and Associates, 2001; Wimberley et al., 2003). Waste from concentrated animal feeding operations (CAFOs) has been linked increased levels of nitrates in drinking water, fish kills, and the development of antibiotic resistant bacteria (Natural Resources Defense Council, 2004; Harris, 2004). CAFOs have also been linked to air and water pollution, which stems from the dust and manure produced

daily by a large number of animals in a small area (Harris, 2004). The MSU provides producers with slaughter and processing options that are appealing to a growing number of consumers.

Alternative Marketing Opportunities

In recent years, one of the most rigorously challenged segments of American agriculture has been the beef industry (Harding and Korthuis, 2002). A majority of Wyoming's cash receipts are derived from the sale of livestock, particularly beef cattle, and Wyoming producers have felt the impacts of industry fluctuations. According to the USDA's Economic Research Service (2002), cash receipts from the sale of beef cattle and calves were $443.8 million, while in 2001, receipts totaled $757.2 million. Producers are consistently trying to identify new markets to lessen the impacts of price fluctuations.

Producers and processors have learned that meat marketing is becoming more "consumer driven" and less "producer-driven." To successfully improve beef demand, the industry must focus on consumer preferences, be conscious of changing tastes and attitudes towards beef, and consider new "value added" products (Harding and Korthuis, 2002). There is a multitude of value-added classifications, but the terms natural and organic appear to be the most prevalent. These classifications have developed to meet the demand from an increasing number of consumers who are interested in how their food is raised and the health benefits attributed to certain production/processing methods. According to the Organic Trade Association, sales of organic beef almost topped $10 million last year, although this still represents less than 1% of total beef sales. The Association estimates that cash register receipts could increase 30% annually through 2008 (Reuters, 2004). Successful markets for natural or organic meats are a reality, and

many natural and organic products are moving beyond the "niche" category to the mainstream supermarket (Agricultural Outlook, 2000; Dimitri and Greene, 2002).

According to researchers at the University of Hawaii at Manoa, "Animals raised in a low stress environment, such as open range, are healthier, and research has shown that forage-based meats, eggs, and milk are lower in fat and cholesterol, and higher in omega-3 fatty acids and conjugated linoeic acids (CLAs). Adequate amounts of omega-3s lower the risk of many types of mental disorders, high blood pressure, heart attacks, and some types of cancer. CLAs have been shown to reduce the risks of cancer, obesity, diabetes, and several immune disorders." This is the kind of information fueling the increasing demand for natural or organic meat.

However, in order to market product as organic, the stock must first be raised according to the organic regulations and then processed in a facility that is also certified to meet these standards. Powell, Wyoming is home to one certified organic livestock slaughter and processing plant. Unfortunately, the plant is not USDA inspected and, therefore, certified organic producers are not able to access specific markets outside of the state even if they take advantage of the Powell plant's ability to offer certified organic slaughter and processing.

The meat packing industry is becoming more and more concentrated. In fact, just four companies control nearly 80% of beef slaughter (Heffernan et. al, 1999; Mathews et al., 1999). There is a general economic consensus that states when four firms control more than 40% of the market share, that market is no longer truly competitive (Heffernan et al., 1999). The lack of a competitive marketplace often nullifies any marketing leverage once held by small-scale producers. Not only is owner concentration an issue,

but much of the meat industry is vertically integrated as well. Many rural sociology studies strongly suggest that this combination of concentration and vertical integration in the meat industry is detrimental in numerous ways to the social and economic fabric of America's rural communities (Harris, 2004). For example, communities with large, industrial hog operations tend to have lower per capita incomes and more people using food stamps (Harris, 2004). In order for small-scale producers to compete in the meat marketplace, many have changed gears from commodity production and now focus on specialized markets, such as organic or grass-fed. As Georgia cattle producer Bob Woodall states about his forage-fed beef program, "We can directly market our beef to these consumers for more than we can get at the sale barn" (Haire, 2004). Providing smaller scale producers with the ability to directly market their meat products has the potential to positively affect not only the economic vitality of the producer, but also of their community as well (Harris, 2004).

Humane Livestock Slaughter and Meat Quality

Humane treatment of livestock prior to and during slaughter has both social and economic implications. According to Appleby and Hughes, "Meat consumers are increasingly demanding that animals be reared, handled, transported and slaughtered using humane practices. A mobile processing unit comes to the livestock rather than the livestock coming to the processing unit, virtually eliminate transportation related stress and injuries." Temple Grandin states on her web site, "Stress induced meat quality problems such as dark cutters cause large monetary losses to the livestock industry. High financial losses are incurred by the livestock industry as a result of carcass bruising. Bruising is an impact injury that can occur at any stage in the transport chain." Dark

cutters, according to the National Beef Quality Estimate, cost the beef industry estimated losses of $5.00 for every fed animal slaughtered. Other research suggests that dark cutters may result in a 10% or more price discount (Grandin, 2004). Dark cutters often result from fighting when unfamiliar animals are mixed in pens shortly before slaughter (Grandin, 2004). Reducing stress as much as possible prior to slaughter helps insure that the meat will be of the highest possible quality. One of the primary ways to reduce stress prior to slaughter is to avoid shipping and exposing livestock to unfamiliar mates. A MSU system which brings the slaughter unit to the farm or ranch is an ideal way to reduce stress.

Project Direction

Based on the compelling research and circumstances, the project collaborators approached the research by dividing the tasks: producer survey, cost projections for an MSU, and cost of upgrading existing plants. Sheridan College did the producer survey, which was contracted to Sharon Elwood, an institutional researcher from Sheridan, Wyoming. Cost projections for and operational design of the MSU was contracted to Bruce Dunlop of the San Juan Islands Co-Op, which currently operates such a unit. Cost projections for retrofitting existing state inspected plants was contracted to Andy Rose of MAMTC, a Wyoming-based consulting firm. These later two segments were merged into one for the purpose of this report.

CHAPTER II

PRODUCER SURVEY

This research project was broken down into three segments. One was to survey current Wyoming livestock producers to gauge their level of interest in this concept. The second was to determine the status of meat processing plants currently operating in the State of Wyoming. The third was to develop a cost analysis model that would be applicable to Wyoming and assess the economic viability of marketing Wyoming livestock through a mobile slaughter unit.

Methodology

An important component of the Mobile Meat Processing Feasibility Study was to survey producers. Development of the survey instrument began with a discussion among grant participants on appropriate questions to include on the survey. Through our discussions and a review process, twelve questions were developed. A bubble software package was chosen to develop the survey instrument. This choice resulted in a document that would be easy for the reader to complete and efficient to compile.

Mailing lists were requested and received from the Wyoming Business Council and the Wyoming Stock Growers Association. Approximately 750 surveys were mailed to producers in Wyoming. In a letter that accompanied the survey, producers were given the option of completing the survey via the Internet, but we found that only a small number chose to do so. Copies of the surveys were also included in some publications, including the *Wyoming Livestock Roundup*. The survey was also promoted at the joint

meeting of the Wyoming Stockgrowers Association and Wyoming Woolgrowers Association in December 2003.

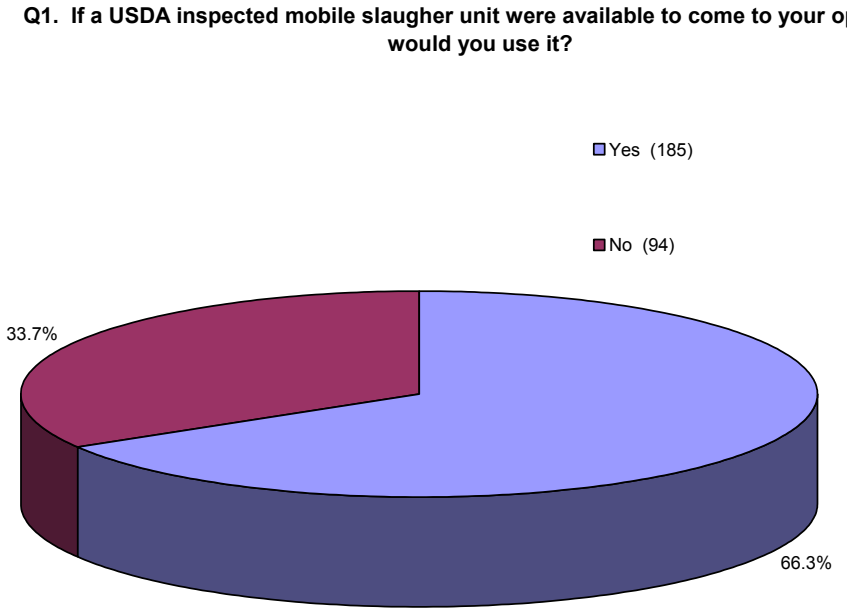
The mailing included an introductory letter, abstract, survey, and a self-addressed envelope. The letter included some background information on USDA inspected facilities, the purpose of the survey, an invitation to complete the survey, and a deadline for completion. The abstract provided a summary of the study and its objectives.

As the survey deadline approached, a postcard was mailed to producers encouraging them to participate in the survey process. A few surveys arrived after the deadline, but were still included in the compiled report. Also, responses from the web survey and publications were added to the data file of scanned surveys and included in the compiled report.

Survey Results

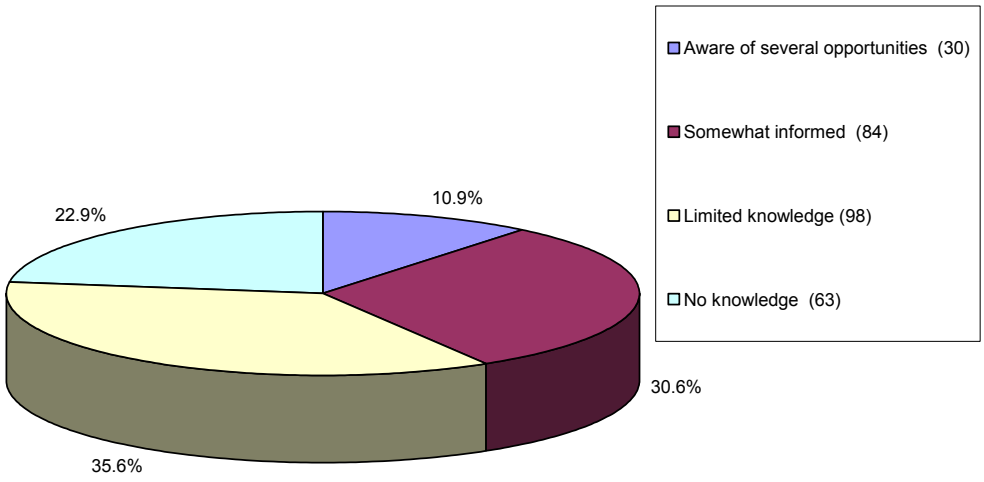
A total of 288 individuals responded to the survey and expressed their opinions on the need and value of a mobile slaughter unit. Data analysis was performed on almost all responses received through the survey, including those respondents who stated they would not use the MSU itself. There were also nine responses received that did not state whether they were or were not interested in the MSU; these nine responses were not included in the data analysis, even though these respondents answered other questions in the survey.

About two-thirds of the respondents (66.3%) indicated they would consider using a mobile slaughter unit if one was available (Q1 Pie Chart). The survey did not ask assess why the 33.7% of "no" respondents would not use the MSU should one become available.

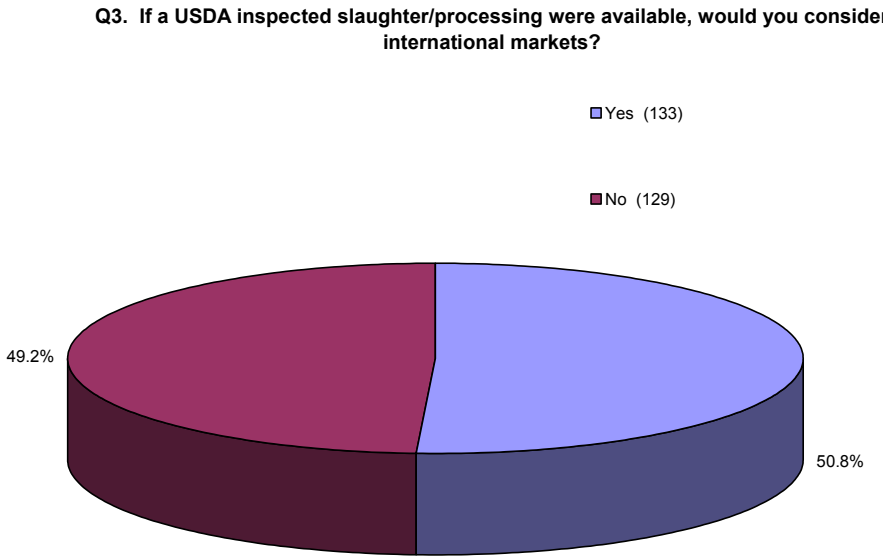


Responses to question two (Q2 Pie Chart) indicated that approximately only 11% of the respondents felt themselves well informed about the marketing opportunities available to them if USDA inspected slaughter was available. A large number of respondents were somewhat aware (30.6%) or had limited awareness (35.6%) of marketing opportunities, which suggests that a thorough discussion of marketing options would greatly aid promotion of the MSU. This discussion could also greatly benefit the almost one-quarter of respondents who stated they have no knowledge of potential marketing opportunities.

Q2. What is your awareness level of the additional marketing opportunities that would be available to you if USDA inspected slaughter was available?

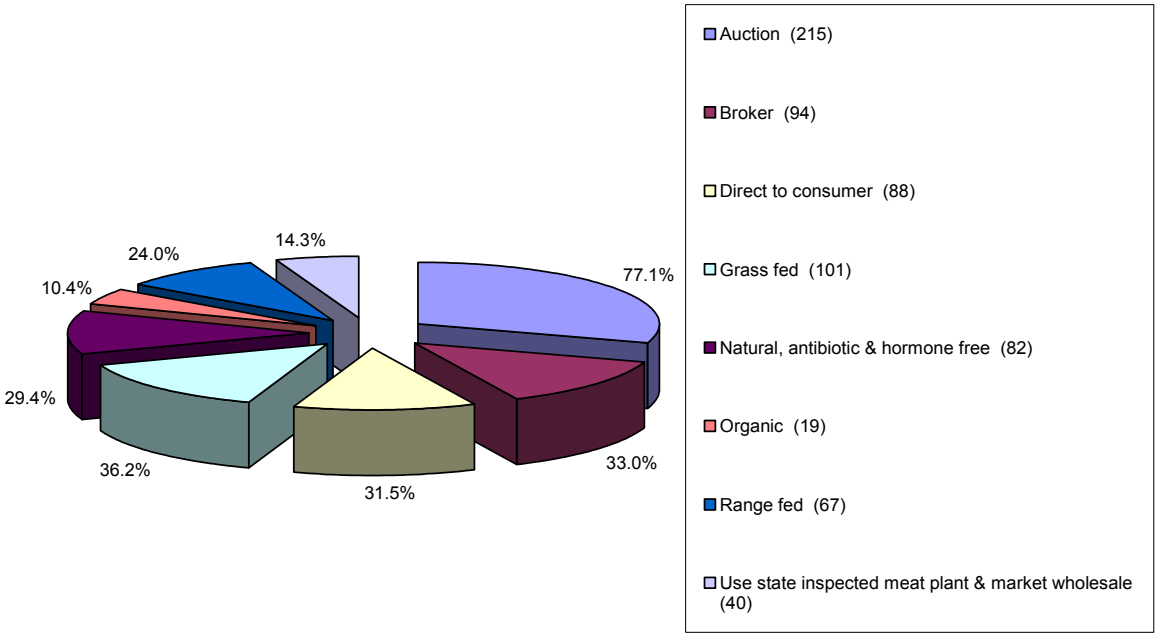


There is considerable interest in exploring the international market (50.8%) if a USDA approved facility were available, as shown in Chart Q3. At the present time there are a number of Wyoming producers selling live animals to companies who are involved in the international proceeded meat market.

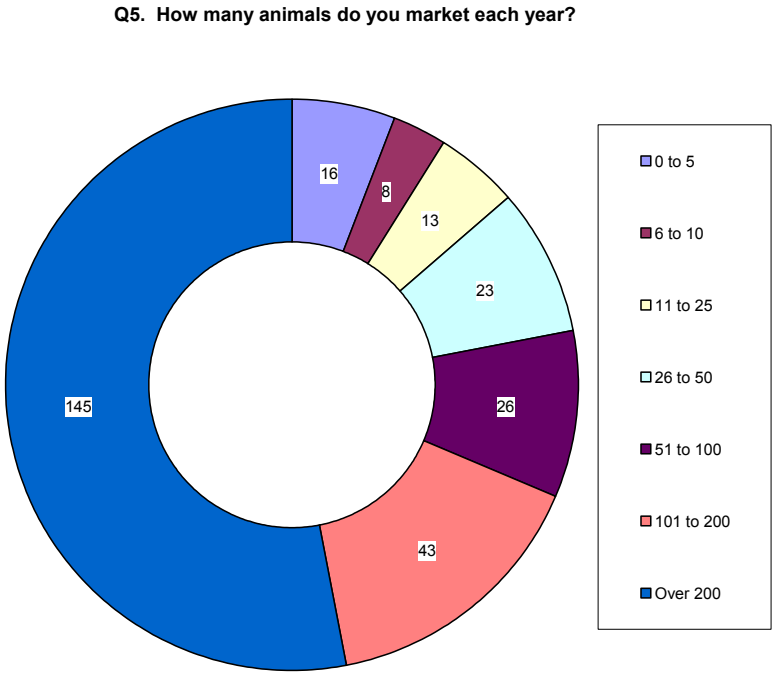


While a variety of different marketing methods are reported (Q4 Pie Chart), a surprising proportion of producers are already involved in alternative or niche marketing of their livestock. Eighty-eight producers (31.5%) reported that they utilize direct-to-consumer marketing. Because smaller scale beef ranchers already own a majority of the calves destined for beef markets, they are in an excellent position to capitalize on the economic benefits of direct-to-consumer marketing and pass these benefits along to their communities. Research has shown that livestock operations in this category tend to make 80% of their business expenditures within 20 miles of the farm, as compared to 50% for factory farms (Harris, 2004). In Wyoming, the expected mileage radius would probably be somewhat greater than 20 miles, but rural Wyoming communities could still reap the benefits of increased income generated by a mobile slaughter unit to local farmers.

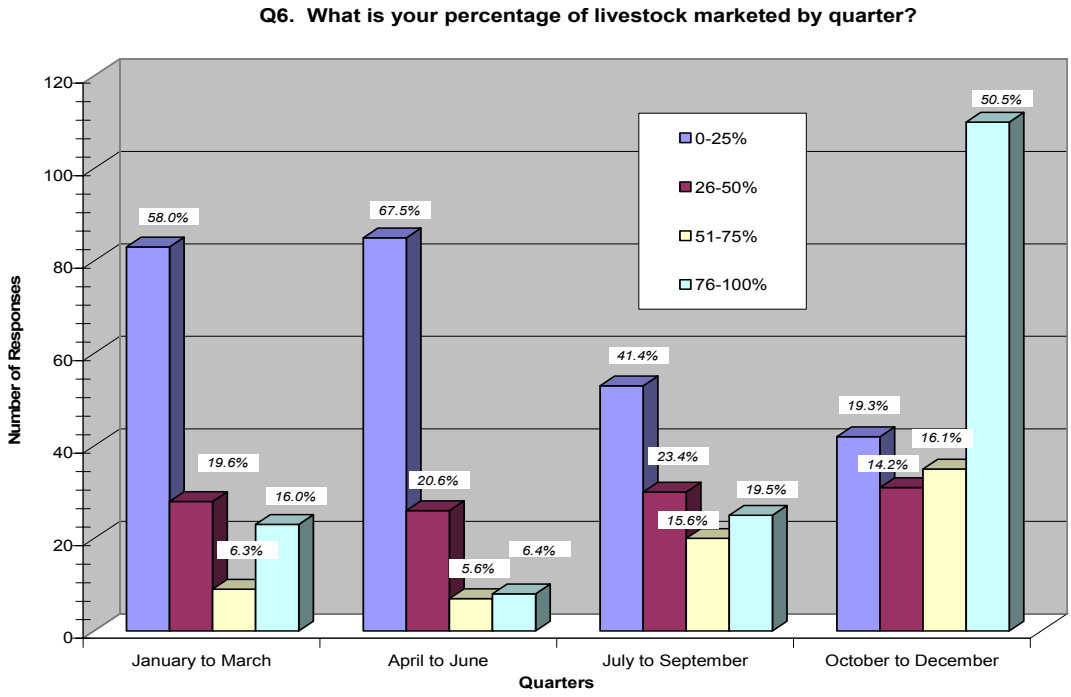
Q4. How do you presently market your animals?



The number of animals marketed by survey respondents (Q5 Circle Chart) ranged from 0 to 5 head to over 200 head annually. Over one-half, or 58.5%, of respondents indicated they market over 200 head of animals each year. This category of respondents, at the minimum of 200, would account for a potential volume of 17,400 animals per year through a mobile slaughter unit. By facilitating access to new markets, a MSU may also encourage other producers to increase the number of animals, and variety, they produce annually.

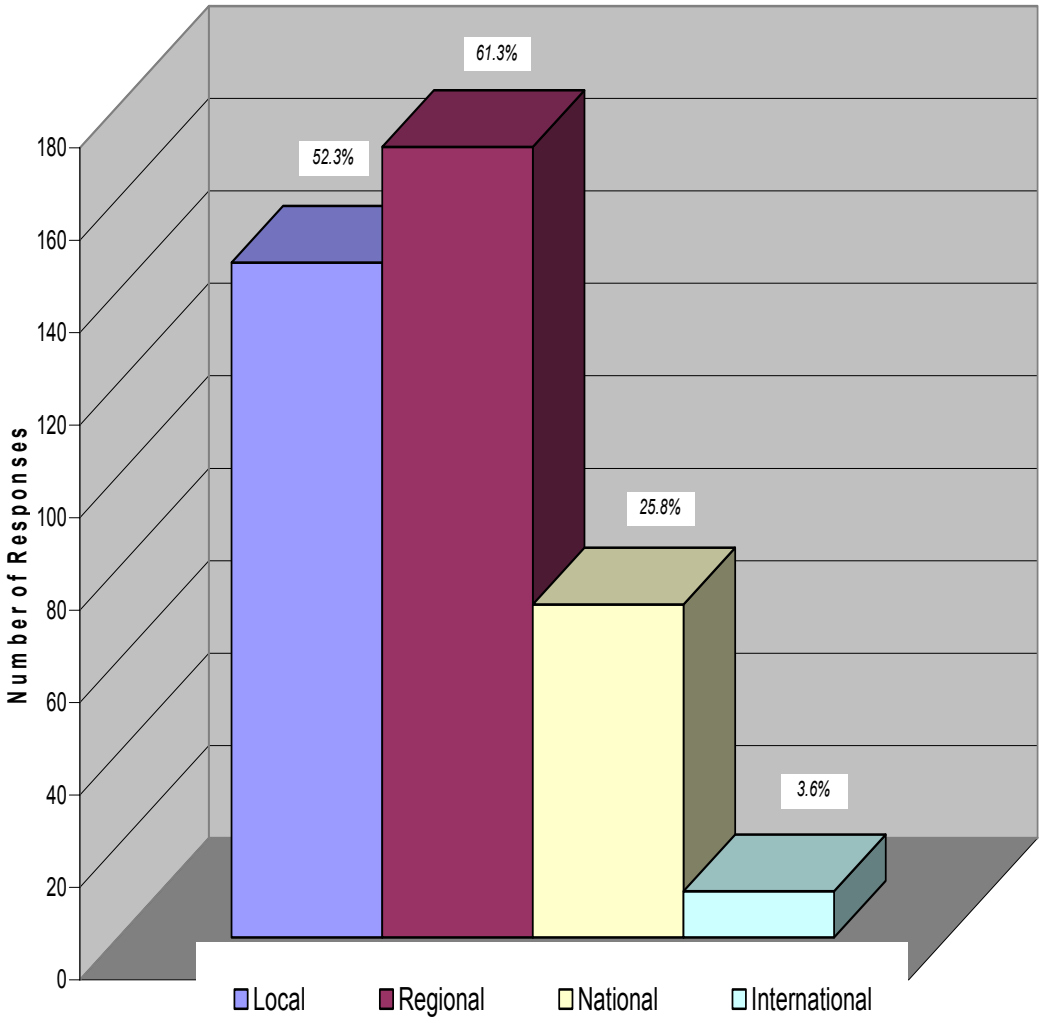


The issue of supply, especially year around, is common in the meat industry. Data collected from survey respondents (Q6 Graph) suggests that meat animals will probably be available in late summer to early fall. It is not unexpected that 50-68% of livestock are marketed in the fall or early winter in large quantities. Typically in Wyoming and the Rocky Mountain region, calves are born in the late winter/early spring, are weaned and fed out to approximately 18-24 months of age, and then taken to slaughter. However, interpretation of this data is dependent upon that assumption that most respondents were calf or lamb producers with plans to sell weaned stock to feeders. Yearling operators may have a different timeline with respect to marketing during the year, and there are a few operations that calve in the fall, too. Until more detailed data is collected about what specifically is marketed during the year, discussions of supply and seasons of activity for the MSU are rather limited.

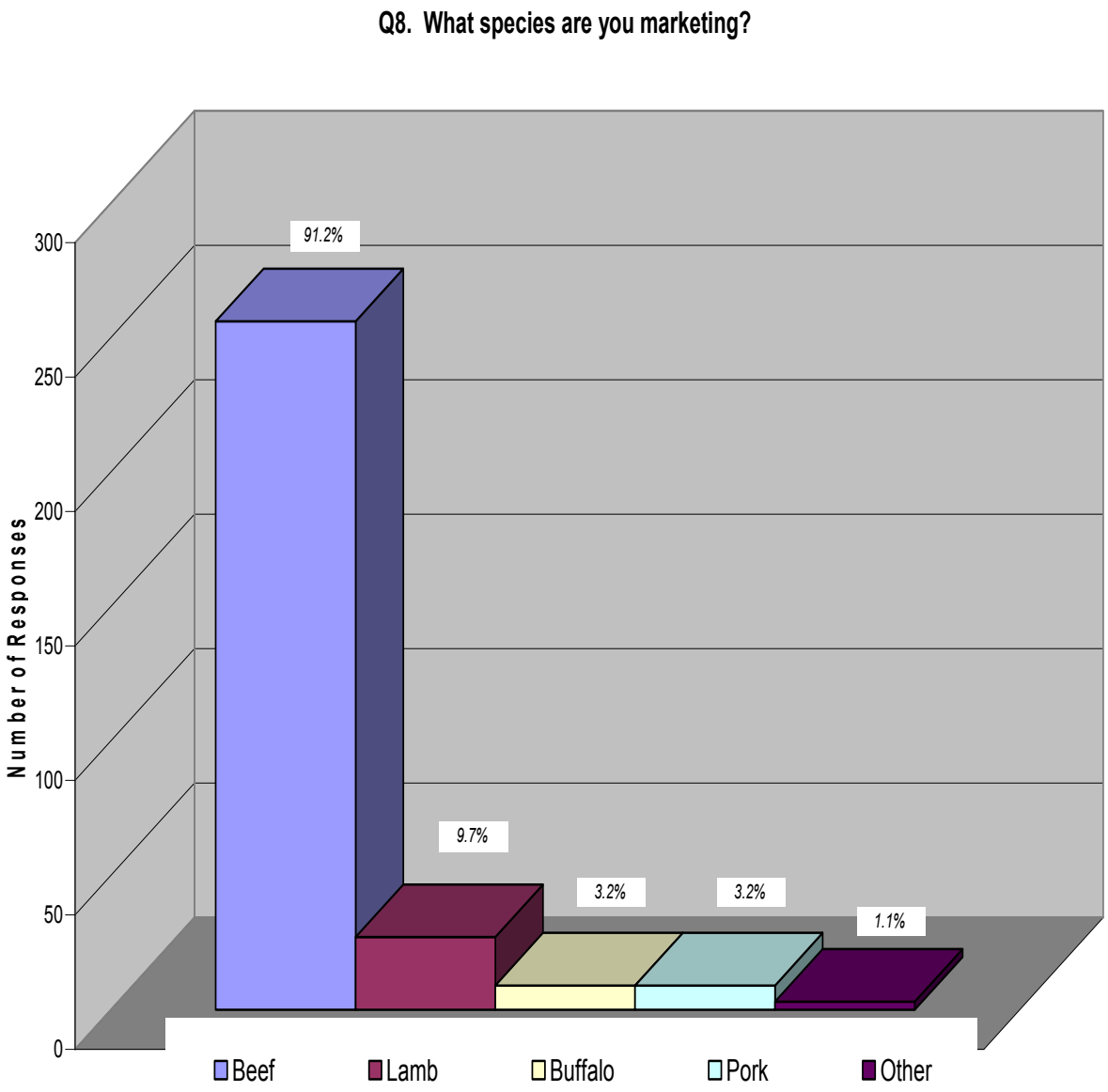


As expected, most respondents (52.3% and 61.3%, respectively) are focusing on local and regional markets. It is suspected that this includes custom slaughtered animals, in addition to a majority of state-inspected and some USDA inspected stock. A few producers are able to access USDA plants that are relatively close to their operations, and are also expanding their product line on a nationwide basis.

Q7. What geographic market areas do you currently target?

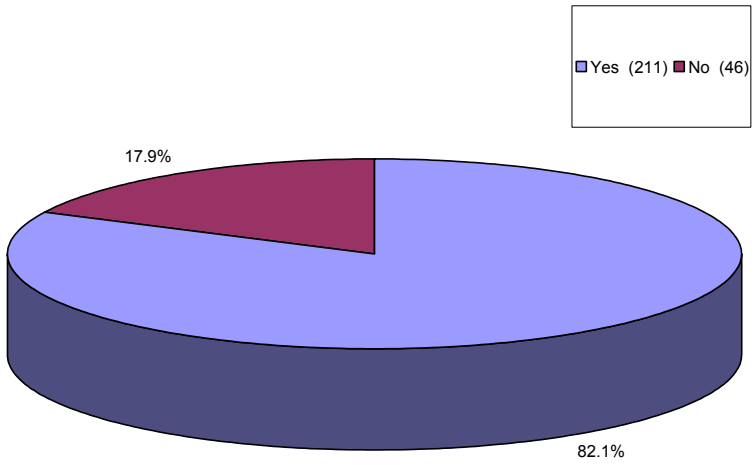


A majority of respondents (91.2%) listed beef as a species they currently market (Q8 Graph). The inability to access a Wyoming sheep producers mailing list may have biased the sample against that species. Buffalo and pork are also marketed, but in equally low percentages (3.2%).



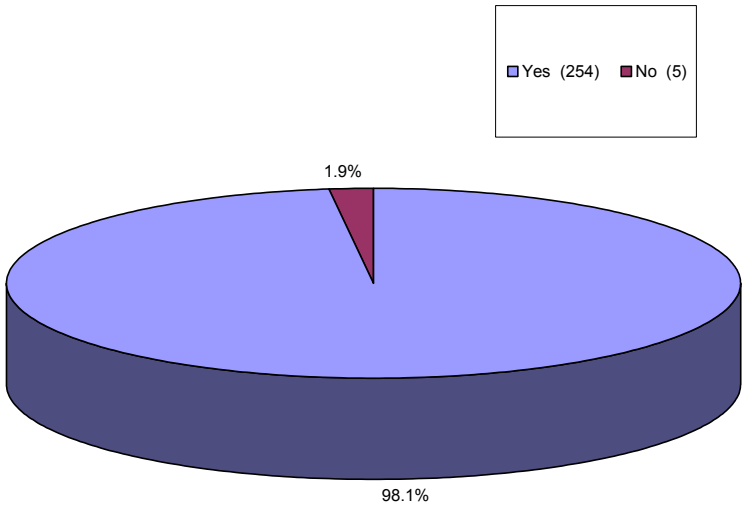
A majority of respondents (82.1 %) are able to provide potable water at their farm or ranch to accommodate the MSU.

Q9. Is there a potable water source on your ranch that would be near the mobile slaughter?

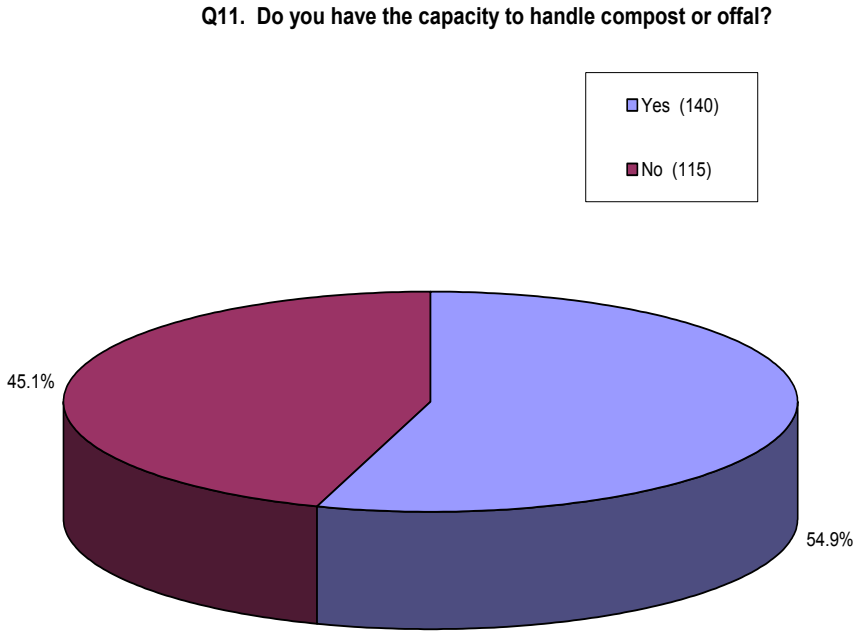


As expected most farms and ranches have a temporary or permanent corral to secure animals before shipping to market. These could be utilized for the holding area when the MSU is on site.

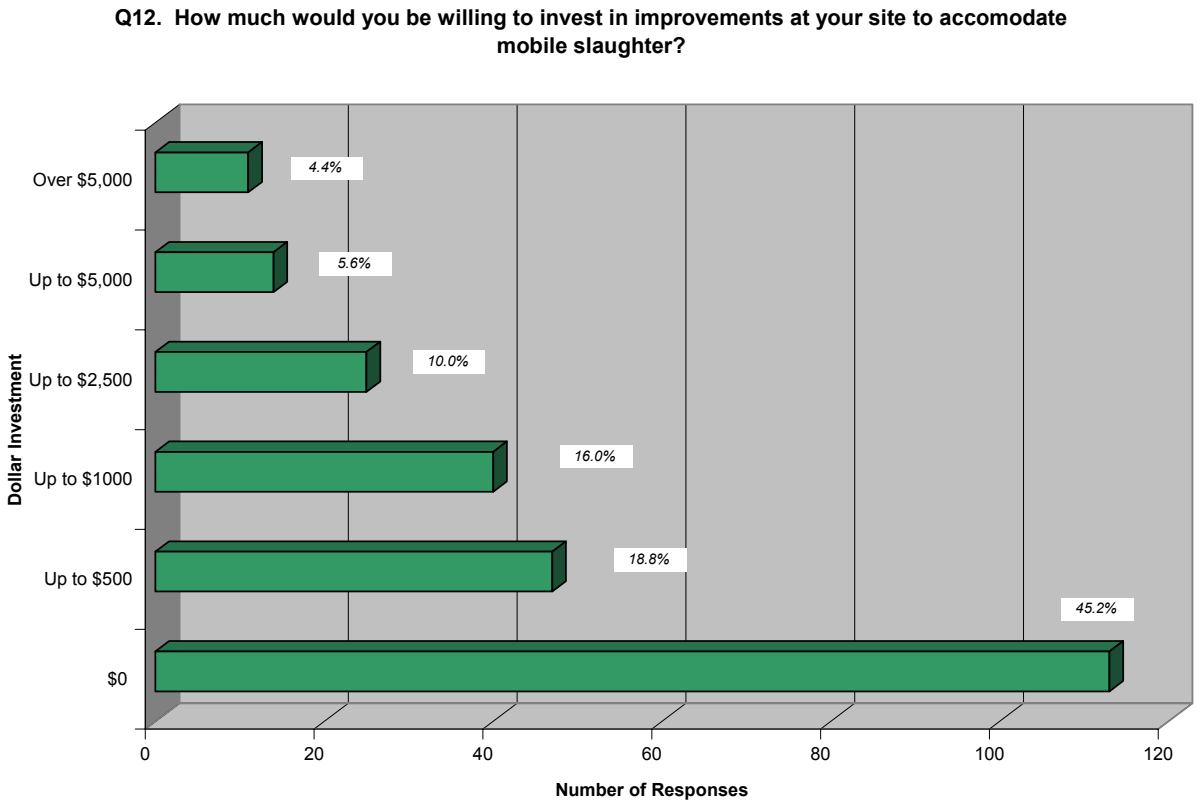
Q10. Do you have a temporary or permanent corral to secure animals?



One of the criteria for a mobile slaughter unit is a safe and effective method for the disposal of animal offal. If alternative markets for the offal are not capitalized on then on farms and ranches, composting of offal becomes an economic necessity.



The purpose of this survey was not specifically designed to measure the level of commitment to mobile slaughter by the livestock producers (Q12 Graph). Although 45.2% of the respondents indicated they would not be willing to invest any dollars into site improvements, a majority (54.8%) of the respondents indicated they were willing to invest some of their own money to accommodate a mobile slaughter unit.



In response to the other survey questions, a majority of the respondents have a potable water source (82.1%), some type of corral system in place for livestock holding (98.1%), and some interest/ability in handling the offal/compostables (54.9%).

The complete survey is provided in Appendix 1.

CHAPTER III

CURRENT WYOMING SLAUGHTER & PROCESSING PLANTS

In Wyoming there are currently no USDA inspected facilities. This situation requires producers who are interested in interstate marketing of their livestock to leave the state in search of federal slaughter and processing facilities. This not only increases costs, but also results in greater stress on the animals. Table 1 shows the total number of State inspected and custom plants in Wyoming. It should also be noted that the basic food safety regulation allowing for interstate sales of meat in the U.S. requires that slaughter and processing be done under USDA inspection, a service currently unavailable in Wyoming.

Table 1

TOTAL NUMBER OF SLAUGHTER AND PROCESSING ESTABLISHMENTS INSPECTED BY STATE IN WYOMING AS OF NOMEMBER 1, 2003

I. NUMBER OF OFFICAL PLANTS UNDER INSPECTION	Type	Slaughter Only	Processing Only	Slaughter & Processing	TOTAL
	Meat Only	2	15	12	29
	Poultry Only				
	Meat & Poultry				
	TOTAL	2	15	12	29
II. NUMBER OF CUSTOM-EXEMPT PLANTS					
	Meat Only	1	11	15	27
	Poultry Only				
	Meat & Poultry				
	TOTAL	1	11	15	27

Table 2 summarizes the total number of animals that are processed in state inspected plants. It should be noted that most of Wyoming's livestock production is shipped and processed out of state. The number of animals processed by custom plants is not tracked and not available at this time.

Table 2						
STATE SLAUGHTER AND PROCESSING PLANTS						
In Wyoming from October 1, 2002 – September 30, 2003						
SPECIES	ACTUAL NUMBER SLAUGHTERED					FY TOTAL # SLAUGHTERED (000)
	CODE	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	
Bull	11	25	47	59	37	168
Steer	12	152	189	300	542	1183
Cow	13	30	100	138	76	344
Heifer	14	136	190	136	103	565
Calf	20	2	0	0	0	2
Mature Sheep	31	48	118	62	186	414
Lamb	32					
Goat	40				2	2
Market Swine	51	168	391	334	796	1689

Chapter IV

I. Mobile Livestock Processing System Description

A. Livestock Processing Operations

The processing system evaluated here consists of a Mobile Slaughter Unit (MSU) capable of USDA inspected in-field slaughter, and a fixed site USDA inspected fabrication and packaging facility. The fabrication facility serves as a "home base" for the MSU, which travels to the ranches in a service region approximately 200 miles in diameter.

The MSU travels to the ranch for on-site slaughter of livestock. The MSU is completely self-contained for operation at remote sites and can remain on site for two days of operation. Site facility requirements supplied by the ranch owner are limited to secure corrals and animal handling facilities suitable for the species to be processed. Pens made with portable panels have proved adequate for beef and lamb, so a pen can be set up at any region of the ranch so desired. After processing, the dressed and chilling carcasses are then transported to the fabrication facility for dry aging, fabrication and packaging.

The general process of slaughter and meat processing to be supported is described below.

1. The MSU -- a tractor-trailer combination with mechanical/storage, refrigeration, and processing sections -- travels to individual farms and ranches.
2. A butcher/driver, accompanied by a USDA inspector, operates the unit.
3. USDA inspector conducts ante-mortem inspection of animals.
4. The butcher slaughters and bleeds one animal at a time in the field.

5. The carcass is brought into the processing section of the mobile unit, where skinning, evisceration, post mortem inspection, and washing occur.
6. Carcasses are moved to the refrigerated section of the unit, where they are hung on rails until the mobile unit returns to the USDA-inspected fabrication facility.
7. Offal remains on the farm and is composted for use as a soil amendment.
8. Hides are transported to the facility and held for sale to a hide company.
9. MSU returns to the fabrication facility at the end of the day, where carcasses are transferred to a refrigerated cooler for aging and the unit is cleaned.
10. Carcasses are dry aged in a cooler for a suitable period (determined by the producer and/or market).
11. Carcasses may be graded (depending on marketing strategies).
12. Carcasses are cut into retail portions and wrapped, or into primal cuts from which similar retail cuts can be taken (the latter are intended for wholesale sales to markets with their own meat cutters).
13. Wrapped portions are stored for sale for sale as fresh or frozen product (the length and type of storage and the final marketing of products may vary).

MSU Operating in Washington State

B. Infrastructure and Equipment for Basic Mobile Processing Unit

The MSU will include the following functional components, or modules, with the equipment noted:

1. Power train (truck), to haul the whole unit to ranches.
2. Mechanical/storage unit, containing potable water tank, water heater, generator, containers for transporting hides back to fabrication facility.
3. Refrigerated unit: with hanging rails and a connection for transfer of carcass on rails from processing unit; the unit will be large enough to hang approximately 10 large beef carcasses (or the equivalent in some combination of beef, lambs, and hogs).
4. Carcass processing unit: designed, constructed, and equipped to meet requirements for a USDA meat slaughtering/processing facility to ensure a safe, sanitary product, e.g.: impervious materials for easy washing; adequate lighting; sink; hot and cold water; slanted floors; waste water drains; carcass hanging rail; hoist for raising/lowering carcasses; trays; space to walk around carcass for inspection and note taking.

C. Infrastructure and Equipment for Fabrication Facility

The fabrication facility will include the following functional components, with the equipment noted:

1. Carcass intake and aging, consisting of an extendable rail system for unloading carcasses from the mobile unit, rail scale,

Typical Small Scale USDA Fabrication Facility

and refrigerated cooler for aging beef quarters.

2. Meat cutting and wrapping areas, containing hanging rails, cutting equipment, tables, trays and dollies, other meat processing equipment as required such as a grinder, scales, wrapping equipment, sink, water heater, and similar equipment.
3. Freezer storage for wrapped portions or pieces.
4. Dry storage, for materials, supplies, and spares.
5. Loading/unloading dock, for receiving and sending shipments and washing down the mobile unit.
6. Administration and staff support facilities, including office and bathroom.

D. By-product Utilization

Aside from hides, which have value when processed to leather, the offal (viscera, bone, hoofs, and all remaining carcass material) has potential for value-added products. Traditionally, in a MSU the remains are composted on farm on the surface of the ground or buried. There are two other approaches: production of 1) a liquid fertilizer or 2) a dry composted material. Each of these requires transporting the remains to a centralized location. Generally, a possibility is to use a patented process for hydrolysis tissue digestion. Tissue digesters have been developed by a company in the mid-west with over 35 plants in operation. This process incorporates heat to create an environment for hydrosalite-anaerobic conditions in which entire animals or remains can be processed. Using the first step would create a liquid fertilizer that is land applied. This liquid, however, shows a PH of 10.3-11 which is excellent for acidic soils, but not for western alkali.

A second step using further fermentation can create biodiesel. While the costs are significantly higher, this represents a value-added product that is seeing increased demand, and being given subsidies from the federal and state governments. Wyoming has a biofuels and ethanol subsidy of 2 million dollars annually. The process requires three components; feedstock, chemical conversion, and capitalization costs. A Canadian company is claiming production costs of 7c/liter.

The second possibility creates a blended compost using sawdust. Several mills across the state offer sawdust at no charge, which can be blended in a mix with the offal. Bulk or bagged product is one opportunity for this approach. The technique involves layering sawdust with offal and allowing some time for biological activity and evaporation of liquids. The blend desired would achieve a ratio of carbon to nitrogen of 40:1. Turning with a blade will enable mixing to a homogenous blend of product that can then be bagged in a small scale commercial bagging system Baggers can be as small as 5HP hydraulic units, which can bag up to 20 bags per minute. These units have various levels of automation, the price varying accordingly. Capitol costs range from $15,000 to $30,000 and there would be increased operating and materials costs (electricity, bag, labor). Compost sells for approximately $6/bag.

This secondary opportunity could be pursued by individual ranchers, or could be developed by the owner of the MSU.

II. Alternative Scenarios Evaluated

Operating scenarios at two levels of capacity have been evaluated as part of this study.

Daily processing capacity of the MSU and the size of the corresponding fixed facility are as shown in Table 1.

A. Single Unit MSU

The Single Unit MSU is modeled after the MSU operating in Western Washington State. It has a daily capacity of 5 head of beef and requires one butcher to operate. The MSU for the Single Unit MSU consists of a truck and trailer combination that travels to the ranch site. Entirely self-contained, the trailer is outfitted with a processing section for skinning and evisceration, cooler for chilling carcasses and a mechanical/storage area. An onboard generator supplies the electrical needs of the unit and sufficient potable water is carried for 1-2 days of operations.

B. Double Unit MSU

In this case, dividing the slaughter and carcass cooling into two units, and employing a second butcher, results in increased capacity. The processing trailer is similar to the Single Unit MSU unit but with an expanded processing section and no cooler. A refrigerated truck or trailer, outfitted to hang carcasses, mates with the slaughter trailer in the field. Using a second butcher and vehicle to achieve this additional capacity results in a greater daily cost of operations but this is offset by increased production.

Table 1: Facility Alternative Comparison

	Single Unit MSU	Double Unit MSU
MSU Average Daily Capacity (hd/day)	5 beef or 20 lambs	8.5 beef or 34 lambs
Fixed Facility Size (ft^2)	2,500	3,500
Hanging cooler (ft^2)	450	900
Freezer (ft^2)	350	650
Staffing (FTE)	6.5	10

III. Financial Analysis for Operating Mobile Processing Units

The economic benefits for the State of Wyoming, from investing in USDA Inspected mobile processing, would flow from the additional wealth created by adding value to the beef products produced in the state. Instead of shipping beef calves out of Wyoming for finish feeding and processing, the calves would be retained in state and the value added from these operations generates additional primary wealth. A summary of the financial picture is presented in Table 2 for the two cases evaluated.

Table 2: Economic Benefits of Wyoming Mobile Livestock Processing

	Anticipated Annual Capacity (beef equivalents/yr)	Cost to Process Beef at 100% of Capacity Operation ($/hd)	Capital Investment Required	Employment Created FTE's	Additional Value Added Wealth Created Annually
Single Unit MSU	950	$300	$449,500	6.5	$1.1 million
Double Unit MSU	1500	$250	$588,500	10	$1.7 million

A. Capital Investment

Development capital for a Mobile Processing Unit operation will be required to fund the construction/purchase of the MSU and a fixed facility. The operating entity will require additional funds to provide for startup and working capital. In this analysis it was assumed that the funding for the MSU and facility building upgrades, including

equipment, would be loan financed over a 15-year term at 8% interest. Startup and working capital comes from equity investment by the owners of the operating entity.

The fixed facility capital requirements assumes starting with a leased building shell, which has all utility services such as municipal water, sewer, electrical and road access in place. Remodeling of the interior into a meat processing facility, and the purchase of processing equipment, make up the total capital investment. In each case the fixed facility is sized to meet the full capacity operation of the MSU. Startup and Working Capital is taken to be equal to the average expenses for 4 months of operation. The total capital needs for each case are presented in Table 3 and a detailed breakdown of the MSU and fixed facility capital is presented in Tables 4 and 5.

Table 3: Capital Investment Summary

	Single Unit MSU	Expanded Capacity
Mobile Unit	$150,000	$161,000
Fixed Facility	$204,500	$297,500
Startup & Working Capital	$95,000	$130,000
Total	$449,500	$588,500

Table 4: Mobile Processing Unit Capital Cost

Equipment	Single Unit MSU	Double Unit MSU
Custom trailer as delivered from Factory	$75,000	$64,000
License & Taxes	$ 7,000	$ 6,000
Additional Equipment & Installation	$25,313	$25,313
Truck (estimate for a serviceable used truck)	$ 20,000	$ 20,000
Refrigerated truck (estimate for a serviceable used truck)		$25,000
Commissioning & Testing		
Validation Testing & HACCP Plan/Training	$4,500	$4,500
Staff Training	$1,500	$1,500
Design & Project Management	$15,000	$15,000
Total	$148,313	$161,313

Table 5: Fixed Facility Capital Cost

Capital Item	Single Unit MSU	Double Unit MSU
Interior remodeling construction	125,000	175,000
Refrigeration Installation	35,000	68,000
Processing and Packaging Equipment	31,000	36,000
Carcass rail system	10,000	15,000
Office Equipment & Furniture	3,500	3,500
Total Capital	204,500	297,500

B. Operating Revenue and Expenses for Livestock Processing

Any financial projections are dependent on the underlying assumptions they are based on. The general assumptions for the operation are presented here. A sample of the financial model with the detailed input assumptions is in Table 7.

1. General Operating Assumptions

a. The MSU and fixed facility are operated as one USDA Inspected establishment and integrated business.

b. The processing is done on a fee for service basis with ranchers or a separate marketing company maintaining ownership of the meat products. Therefore no revenue or expenses associated with marketing of meat products is included in this analysis.

c. The nominal annual capacity is determined from an expected operating average of 4 days per week. The non-operating 52 days per year are allocated for statutory holidays, regular maintenance and unscheduled downtime.

d. Actual capacity is nominal capacity adjusted for anticipated seasonal fluctuations in livestock availability according to the following table.

Table 6: Seasonal Utilization Percentage

Jan	Feb	Mar	Apr	May	Jun – Nov	Dec
50	25	25	50	75	100	75

e. Beef and Lamb are processed in equal numbers of animals. Consequently 80% of the operating time is for beef and 20% for lamb.

f. Beef carcasses are dry aged for 14 days and lamb for 5 days. To meet this requirement the fixed facility cooler is sized to hold the maximum production expected in any 2-week period.

g. The fixed facility is designed to accommodate the MSU operating at full capacity.

2. Projected Operating Financials

The operating revenue and expenses were developed for both the Single Unit MSU and Double Unit MSU using a financial projection model calibrated with two years of actual operating data obtained from the operation of the MSU in Washington State. Presented in Table 7 are the revenue and expenses expected if the units are operated at full and 50% of actual capacity. While there are many variables that affect this analysis such as labor rates, facility rent and interest on loans; the one of considerable interest to ranchers are the fees charged for processing. For comparison purposes the processing fees are adjusted at each of these capacity utilization rates such that revenue matches

expenses. History with the WA State MSU indicates that operation of the facility at a consistently high percentage of capacity is not likely to occur until the business has been in operation for several years. Consequently the fees required to cover expenses at 50% of capacity operation would be most realistic. It is important to note that the fees required at a given volume of processing are not much greater for the Double Unit MSU (see Figure 1). However, the flexibility of operations and additional capacity would be of significant benefit in order to take advantage of seasonal peak demand.

3. Comparison of MSU Processing Costs with Existing Facilities

There are no USDA Inspected slaughter and fabrication operating today in Wyoming to obtain directly comparable processing costs. However, there are a number of Wyoming state inspected livestock processing facilities currently serving producers. The costs to slaughter and cut to retail packages were obtained for three plants in Wyoming and shown in Figure 2. Costs for the MSU operation are comparable with the state plants, assuming operation is at full actual capacity.

Figure 1: Beef Processing Cost

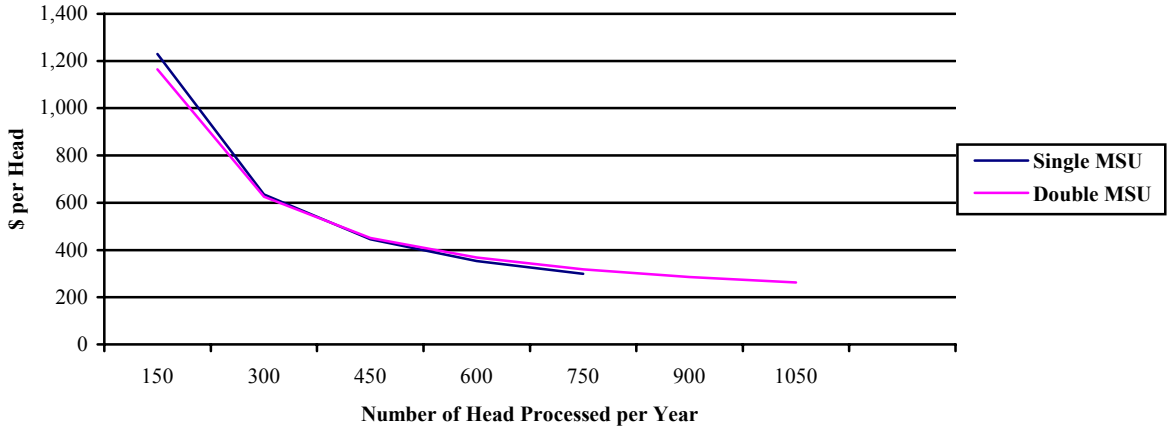


Figure 2: Comparison of Beef Processing Costs
Typical 600 lb Hanging Weight Basis

Single MSU	Double MSU	Facility A	Facility B	Facility C
$291	$241	$220	$272	$305

Table 7: Revenue and Operating Cost Projections

	Single Unit MSU		Double Unit MSU	
	50% Capacity	Full Capacity	50% Capacity	Full Capacity
Annual Capacity (beef /lamb per yr)	390/390	780/780	624/624	1248/1248
Processing fees per head (beef/lamb)	$503/$88	$291/$53	$358/$64	$241/$44
INCOME				
Slaughter Services	62,725	81,382	76,135	113,553
Cut & Wrap Services	177,573	206,413	202,355	274,041
TOTAL INCOME	**$240,299**	**$287,795**	**$278,489**	**$387,594**
EXPENSES				
MSU Slaughter Services				
Allocated Share of Lead Butcher	13,604	27,041	12,719	25,382
Slaughter Assistant labor			13,800	27,540
Payroll tax & Benefits	2,041	4,056	3,978	7,938
Mobile Unit Fuel & Oil	3,247	6,455	4,416	8,813
Propane	98	196	184	367
Equipment Repairs	1,882	2,441	3,807	5,678
Insurance (auto portion)	2,866	2,866	5,000	5,000
Consumable supplies	4,391	5,697	5,329	7,949
Vehicle Taxes & License	672	672	1,344	1,344
Total MSU Costs	**$28,800**	**$49,424**	**$50,577**	**$90,011**
Cut & Wrap Facility				
Allocated Share of Lead Butcher	22,396	8,959		
Direct Labor	42,989	76,460	60,823	114,926
Payroll tax & Benefits	9,808	12,813	12,616	18,832
Insurance	976	976	976	976
Utilities	-	-	-	-
Electricity	5,160	5,160	5,160	5,160
Water	360	360	360	360
Microbiological testing	4,806	5,756	5,570	7,752
Laundry	1,404	1,404	1,404	1,404
Equipment Repair	3,960	3,960	3,960	3,960
Equipment Calibration	200	200	200	200

Pest Control	360	360	360	360
Rendering Pickup & Disposal	1,440	1,440	1,440	1,440
Small Tools	317	317	317	317
Supplies	17,757	20,641	20,235	27,404
Total Cut & Wrap Costs	**$111,933**	**$138,806**	**$113,420**	**$183,091**
G&A				
General Manager	40,000	40,000	40,000	40,000
Payroll tax & Benefits	6,000	6,000	6,000	6,000
Telephone	1,680	1,680	1,680	1,680
Internet e-mail	198	198	198	198
Licenses & Permits	150	150	150	150
Office Supplies	1,080	1,080	1,080	1,080
Accounting & Legal	1,080	1,080	1,080	1,080
Auto Expenses	492	492	492	492
State Business Tax	-	-	-	-
Postage	540	540	540	540
Bank Charges	192	192	192	192
Facility Capital Upgrade Loan Payment	23,452	23,452	34,117	34,117
Mobile Unit Loan Payment	17,202	17,202	18,463	18,463
Facility Rent Payment	7,500	7,500	10,500	10,500
Total G&A	**$99,565**	**$99,565**	**$114,492**	**$114,492**
Total Expenses	**$240,299**	**$287,795**	**$278,489**	**$387,594**
OPERATING PROFIT (LOSS)	**($0)**	**$0**	**$0**	**$0**

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Evidence exists that there is a growing demand for niche market meat products that meet consumer preferences with regard to one or more of the following criteria: animal origin, how the stock was raised and fed, how animals were slaughtered and processed, safety of the food product, and that it is identifiable as to these unique characteristics. A mobile slaughter unit would accommodate the protocol necessary to meet these market demands.

A significant number of Wyoming livestock producers surveyed, 185 individuals or 66.3%, indicated they would consider using a USDA inspected MSU. These numbers point to the level of interest among Wyoming producers in pursuing new or additional marketing strategies for their livestock. As evidenced by the responses to question 3, a number of different marketing strategies are being utilized by Wyoming producers, which indicates their willingness to find ways to add value to their market.

While the interest is there among these producers, they currently have no access to USDA inspected slaughter/processing within the state.

The economics and operational logistics of a mobile processing unit in Wyoming appear to be quite workable. A double unit MSU is projected to create ten new direct jobs and an annual added value to the state of $1.7 million. In a comparison with the cost of slaughter and processing through existing state inspected plants, this same unit is projected to have a beef processing cost of $220/head, while the state plants surveyed ranged from $220-305/head. Not only is the MSU economically competitive, it has the

advantage of allowing for interstate commerce of the product, while the state inspected plants don't.

The study demonstrates that there is a significant number of Wyoming livestock producers interested in using an MSU to add value to their product. Furthermore the study projects such a unit to be economically viable. There are, however, some recommendations that were developed to move this concept closer to reality.

Recommendations. While the study pointed to a high level of interest in the state, it does not quantify exactly the number of potential animals for MSU slaughter/processing or their geographical distribution throughout the state. It is quite possible, given the dimensions of the state, that it will take multiple units to adequately serve the producers. A recommendation is to seek further input from survey respondents to identify possible geographic locations to best serve the customers. This can be accomplished by follow-up mailing and/or media ads.

It also appears, based on the responses to question two, that a sizeable number of producers feel less than fully informed about marketing opportunities available to them via USDA inspected slaughter/processing. It is suggested that regional meetings be established throughout the state to provide outreach on this and other issues related to the MSU concept.

A major question that remains is who, or what entity, would own/operate an MSU in Wyoming. The recommendation is to identify key producers and/or processors and convene these folks, perhaps in conjunction with the above-mentioned regional meetings, to seek their input and level of interest.

Given the propensity of many livestock producers to "see it before they believe it," it is recommended that funds be sought to establish a pilot operation in the state. This initial unit would be used as a model for others that may be initiated under public and/or private financing.

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APPENDIX I

PRODUCER SURVEY

Mobile Slaughter Unit for Wyoming
Assessment of Need and Value

1. If a USDA mobile slaughter unit were available to come to your operation, would you consider using it?
   Yes/No

2. What is your level of awareness of the additional marketing opportunities that would be available to you if USDA inspected slaughter were available?
   I have no knowledge in this area.
   I have only limited knowledge of these opportunities.
   I'm somewhat informed about the opportunities.
   I've done research and am aware of many of the opportunities.

3. If USDA inspected slaughter/processing were available, would you consider international markets?
   Yes/No

4. How do you presently market your animals? Please check all that apply.
   Auction
   Broker
   Use state inspected meat plant and market wholesale
   Direct to consumer
   As grass fed
   As range fed
   As natural (antibiotic & hormone free)
   As organic

5. How many animals do you market each year?
   0-5
   6-10
   11-25
   26-50
   51-100
   101-200
   over 200

6. What is your percentage of marketed livestock by quarter?
   January – March 0 – 25%, 26% - 50%, 51% - 75%, 76% - 100%
   April – June 0 – 25%, 26% - 50%, 51% - 75%, 76% - 100%
   July – September 0 – 25%, 26% - 50%, 51% - 75%, 76% - 100%
   October – December 0 – 25%, 26% - 50%, 51% - 75%, 76% - 100%

7. What geographic market areas do you currently target? Please check all that apply.
   Local
   Regional
   National
   International

8. What species are you hauling? Please check all that apply.
   Beef
   Lamb
   Hog
   Buffalo
   Other

9. Is there a potable water source on your ranch that would be near the mobile slaughter?
   Yes/No

10. Do you have a temporary or permanent corral to secure animals?
    Yes/No

11. Do you have the capacity to handle or compost offal?
    Yes/No

12. How much would you be willing to invest in improvements at your site to accommodate mobile slaughter?
    $0
    up to $500
    up to $1000
    up to $2500
    up to $5000
    over $5000

APPENDIX II

WYOMING SLAUGHTER & PROCESSING PLANTS

STATE-INSPECTED ESTABLISHMENTS

	ADDRESS
Valley Meat Co.	PO Box 65 Ranchester, WY. 82839
University of Wyoming	PO Box 3684, Univ Station, Laramie, WY. 82071
Ben's Foodliner	PO Box 1539 Rock Springs, WY. 82901
Rainbow Grocery	310 S 17th, Laramie, WY. 82070
Jackson Hole Buffalo	PO Box 2100, Jackson, WY. 83001
Big Horn Processing	42 Hwy 14 A East, Lovell, WY. 82431
Dan's Meat Processing	PO Box 116, Evansville, WY. 82636
The Butcher Block	1968 Snowy Range Rd., Laramie, WY. 82070
Northwest Community College	231 West 6th St., Powell, WY. 82435
Nield's Market	PO Box 820, Afton,WY. 83110
Roger's Meat	984 Lane 8, Powell, WY. 82431
Cody Meats	PO Box 726, Cody, WY. 82414
Kelly Packing	PO Box 27, Torrington, WY. 82240
R & B Meat Processing	512 E. 2nd St., N., Green River, WY. 82935
Wind River Meats	PO Box 888, Dubois, WY. 82513
Douglas Meat Processing	49 Esterbrook Rd. Douglas, WY. 82633
Dana Cold Storage	50 Westwood, Thayne, WY. 83127
JB's Sausage/Smokeshouse	628 Main St Lander, WY. 82520
Lane's Meat & Sausage	512 Coburn Ave., Worland, WY. 82401
Riverton Packing	2515 E. Monroe, Riverton, WY. 82501
Lane's Meat & Sausage	512 Cohurn Ave., Worland, WY. 82401
Walt's Meat Processing	2025 Saber Rd., Casper, WY. 82604
Wind River Processing	PO Box 1262, Thermopolis, WY. 82443
Pat's Meat Discounter	702 S. 6th Aye, Mtn View Addn Casper, WY. 82604
Weinrich's Quality Meats	PO Box 327, Casper, WY. 82601
Clark's Meat House	101 W. Freemont, Riverton, WY. 82501
Dave's Custom Meat Shop	PO Box 513, Evanston, WY. 82931

CUSTOM ESTABLISHMENTS

	ADDRESS
Barker's	3553 County Rd 219, Ft. Bridger, WY. 82835
Basin Processing	PO Box 189, Basin, WY. 82410
Big Daddy Meats	617 S. 2nd St. Laramie, WY. 82070
Big Horn Meat Cutting	121 Hwy 16 E., Buffalo, WY. 82834
Bryce's Sausage Kitchen A Meats	PO Box 111, Pavillion, WY. 82523
C & A Meats	PO Box 51, Sundance, WY. 82729
CB & T's Riverton Ice	123 E Park Riverton, WY. 82501
Country Style Processing	PO Box 2334 Glenrock, WY. 82637

Encampment Meat	P.O Box 454 Encampment WY 82325
Farmer Packing	PO Box 156, Kinnear, WY.
Fraughton Meat Company	PO Box 842 Evanston, WY.
Grizzly Processing	1105 E Richards Douglas, WY. 82633
Jan's Meat Cuffing	PO Box 586, Mountain View, WY. 82939
Komma Slaughter	2025 Saber Rd., Casper, WY. 82604
Lergerski Processing	PO Box 951, Sheridan, WY. 82801
Merrill Meat Co	Box 503 Encampment, WY. 82325
Mountain Man Meat & Taxidermy	#6 TW Rd Buffalo, WY. 82834
Pearce Custom Butchering & Processing	7621 Yellowstone Hwy. Casper, WY. 82604
Pinedale Lockers	PO Box 321, Pinedale, WY. 82941
Platte County Processing	PO Box *85,* Wheatland, WY. 82201
Polar Food Bank	161 W. Brundage, Sheridan, WY. 82801
Robefl Meich	1698 Hwy 30, Bosler, WY. 82070
Roy's Cold Storage	236 E. 20th St., Torrington, WY. 82240
Siesta Meat Processing	PO Box 202, Kaycee, WY. 82639
Snake River Processing	PO Box 92, Baggs, WY. 82321
Snowy Range Market	367 Snowy Range Rd., Laramie, WY. 82070
The Butcher Block	PO Box 600, Lymon, WY. 82937
Thunder Basin	733 New Haven, Hullett, WY. 82720
Trails West	PO Box 1257 Rawlins, WY. 82301
Valley Butcher Block	246 E 2nd Ave. Afton, WY. 83110
Yalowizer Processing	1138 Decker Sheridan, WY. 82801
Zero Box	628 N 15th St., Cody, WY. 82414

WILD GAME ESTABLISHMENTS	**ADDRESS**
A&B Wild Game	217 S 4th St. Thermopolis, WY 82443
Barrett Ranch	Albany County Rd #64, Rock River, WY 82083
Big Horn Game Processing	Rte 1, 1038 Smylie Rd Douglas, WY 82633
Creeks Wild Game	12360 Hwy 26 Riverton, WY 82501
Dusty's Wild Game	2521 E Monroe Crt #2 Riverton, WY 82501
Rein's Wild Game	4709 Rocky Point Gillette, WY 82718
Indian Ice & Cold Storage	216 Industrial Ave Casper, WY 82602
Jake's Wild Meat Processing	1000 N 5th St. Lander, WY 82520
Kritter Kutters	110 N Bighorn Moorcroft, WY 82721
Lusk Cold Storage	801 Main St Lusk, WY 82225
Newcastle Processing	PO Box 908 Newcastle, WY 82701
Olds Processing	PO Box 1473 Gilleffe, WY 82717
Sundowner Wild Game	4704 W Yellowstone Casper, WY 82601
Teton Ice	Box 216 Jackson, WY 83001
The Butcher Shop	30 Third St Rock Springs, WY 82901
Tom's Wild Game Processing	204 Sanford Douglas, WY 82633